into two sections—the Aberrantia and the Normalia. In the former section of the Trichobranchiata the family Galathæidæ occurs, which will form the subject of a Report yet to appear by Prof. J. R. Henderson.

The group Aberrantia of the division Phyllobranchiata consists of several tribes and families that in their adult condition approach more nearly to the characters common to other divisions, but which nevertheless during the progress of development pass through a stage common to the normal Phyllobranchiate Macrura. This aberrant group has long been known to biologists under the name of Anomura, and by some has been regarded as a distinct order of Crustacea. Here it is however regarded as a group of the Phyllobranchiate division of the Macrura, "for undoubtedly in their earlier stages they pass through a morphological change that is essentially Macrurous, in which the scaphocerite and rhipidura are both present as well-devoloped appendages, the latter of which they never entirely lose."

This group will be reported on by Prof. John R. Henderson, although two new genera and several new species are described and figured in the present Report.

It only remains to mention that with the exception of two out of the 157 plates all have been lithographed from the original drawings of Mr. Spence Bate. By this fact the value of this Report is intensified, as the author has been able to describe and figure what he has seen with a clearness and distinctness which far surpasses in effect the most brilliant work of the cleverest of artists. In an appendix Dr. Hoek gives a description, with figures, of *Sylon challengeri*, a new parasite Cirriped.

Vol. XXV. also contains but a single Report, that on the Tetractinellida, by Prof. W. J. Sollas. Perhaps no department of zoology has made during the last twenty years such rapid progress as the Sponges, and it is astonishing to think of the large number of forms that have been very fully examined during this period. Certainly no group has benefited more largely by the researches made during the expedition of the *Challenger*, and it was the greatest good fortune that the collections made were submitted to such excellent workers as Polejaeff, F. E. Schulze, Ridley, Dendy, and Sollas. The joint Reports of these authors, and the splendid series of illustrations which accompany them, form a complete history of this group up to the existing state of our knowledge, a history which shows the worker what is not known as well as what is.

The last of these Reports treats of the Tetractinellida, and in an appendix of a small group of Monaxonida, about the exact location of which there was for long some doubt. In its monographic completeness it surpasses all the other Reports on the Sponges, while in the fullness of its morphological details it may well serve as an introduction to a knowledge of all the orders.

The Tetractinellid Sponges of the *Challenger* having been well preserved, it was possible to make a thorough investigation of their minute anatomy, a work involving an enormous amount of labour in the cutting of thousands of thin sections, and the separate examination of most of them. The number of species and varieties obtained by the *Challenger* was 87, of which 73 are new to science. These are arranged in 38 genera, of which 18 are new. in addition there are 221 species mentioned, making the total number of described species 294, and of accepted genera 81.

Dividing the Sponges into the two classes of the Megamastictora (with the single sub-class Calcarea) and Micromastictora, the latter is divided into the three subclasses of Myxospongiæ (Halisarca, &c.), Hexactinellida, and Demospongiæ. The subdivision of this last may be made primarily into two tribes : (1) the Tetractinellida, (2) the Monaxonida. The former may be characterized as Demospongiæ in which some or all of the scleres are tetraxons, triænes, or desmas. The name Tetractinellida was first proposed by Marshall (1876) in practically the same sense as it is used now by Sollas.

Into the details of the sub-orders and families of this tribe our space forbids us to enter. Their descriptions, with those of the genera, will be found in orderly sequence in the introductory chapter, while the descriptions of the species occupy 410 pages of the Report.

In an appendix we have an account of the Sponges belonging to the Spintharophorous sub-order of the Monaxonida, which, under the impression that they were more nearly related to the Tetractinellida, had been omitted from Ridley and Dendy's Report of the Sponges of this tribe.

The figures of the Sponges on the forty-four chromolithographic plates accompanying the Report were drawn by the well-known artist, T. H. Thomas, R.C.A. The Sponge portraits are really beautiful studies from the originals. The figures representing structure were first traced by the author with the camera lucida, and were then drawn by Mr. Thomas direct from the preparation under the microscope.

MATTHEW FONTAINE MAURY.

A Life of M. F. Maury, U.S.N. and C.S.N. Compiled by his Daughter, Diana Fontaine Maury Corbin. (London: Sampson Low, 1888.)

A MEMOIR of the illustrious founder of the science of the physical geography and meteorology of the sea, written by the tender and loving hand of his daughter, cannot fail to be of interest, not merely to that section of thinkers and workers who are engaged in the branch of science which Maury especially cultivated and adorned, but to the larger world who appreciate, and are benefited by, the perusal of the biography of a man of powerful and vitalizing imagination, disinterested labour for the public good, self-denying patriotism, and indomitable perseverance.

Family memoirs are too often apt to degenerate into a mere panegyric of public and private virtues, coupled with a disinterment of private matters which an unbiassed stranger would have too much tact and modesty to expose, and which often destroy all the effects of the accompanying eulogy. Mrs. Diana Corbin has, fortunately, succeeded in avoiding these pitfalls, and by a judicious blending of history, correspondence, and extracts from lectures, has enabled the reader to form his own judgment of the merits and services of her renowned father.

Descended from the French Huguenots on one side, and the English Protestants on the other, Maury seems to have united in his own person the lively imagination we unconsciously associate with the former, together with the somewhat austere and unflinching determination of the latter; and it was by the rare union of these two qualities that he was enabled to vivify the dry statistics which, until his arrival, lay buried in the log-books on the shelves of the Hydrographic Bureau at Washington, like the ooze at the bottom of the Atlantic.

An accidental fall from a tree, early in life, took him from the farm to school; and a subsequent fall from a stage-coach, which permanently crippled him, appears to have exercised a still greater effect on his career by diverting him from his active physical service in the American Navy, to the mental study of the scientific branches of the profession. His appointment to the Naval Office at Washington, mainly through the publication of his anonymous "Scraps from the Lucky-bag," on naval reform, led to its subsequent development into what is now the world-known National Observatory and Hydrographical Department of the United States. Here it was that he inaugurated his "sailing directions," and elaborated his famous "wind and current charts," the absolute commercial value of which, in shortening voyages, was soon universally recognized, though, as usually happens, most tardily by his own country, where, though a Bill for remunerating their author to the extent of £5000 appears to have been brought forward (unknown to Maury) in January 1855, in the following month he was virtually placed in official disgrace, by being retired from the Active Naval List and having his salary reduced to £300.

This manifest injustice to a man, whose mind, if not body, was actively engaged in the highest branches of naval service to his country, was, after persistent vindication of his rights, repaired in 1858, when he was promoted to the rank of Commander, with back pay from the time of his retirement.

While tabulating the observations for his charts, Maury fascinated the world by the publication of the "Physical Geography of the Sea and its Meteorology," a book which, although some of its conclusions—such as an open sea surrounding the North Pole, and the crossing of the winds at the calm belts—have been found to be untenable in the light of more recent facts and research, still remains substantially trustworthy, and certainly unequalled by any modern treatise embracing the same subjects. It would be difficult to adequately estimate the immense contemporaneous and subsequent value of such a work, written in the charming and enthusiastic style which characterized all its author's productions. The present writer traces with gratitude his first attraction to physical geography and meteorology to this delightful book, of which most truly it can be said, that it realized Matthew Arnold's ideal combination, "sweetness and light."

By this book, Maury not only taught the world, but he pleased it at the same time, and he accomplished this rare result, without pandering in any way to mere popular taste, or forsaking the platform of truth. His popularization of a subject until then hardly dreamed of as a science resulted in the greatest achievement of his life, viz. the assembly, chiefly through his instrumentality, of the International Meteorological Congress at Brussels, in 1853, which marked the commencement of the present co-operation of nations in the work of both marine and land meteorology. Regarding the latter, indeed, Maury uttered a prediction, on p. 350 of his "Physical Geography," to the effect that "the greatest move that can now be made for the advancement of meteorology is to extend this system of co-operation and research from the sea to the land, and to bring the magnetic telegraph regularly into the service of meteorology."

At the present time, when the old question between the "cyclonologists" so-called and the "aspirationists" seems likely to be renewed by M. Faye and some of his disciples, it is interesting to notice that Maury never accepted either the purely circular doctrine of Reid, or the purely radial theory of Espy, but agreed with Thom and Redfield in thinking that the wind in a true cyclone blows in spirals, and he gave excellent reasons for his belief.

Maury's study of marine meteorology and physical geography not merely aided commerce by shortening passages, but enabled him to give material assistance to the laying of the first Atlantic cable to Europe; and, in fact, it was to his prediction of the "telegraphic plateau," and acute suggestion of a cord instead of heavy cable for the deep-sea portion, that the ultimate success of this enterprise was mainly due. From the sea, Maury turned his attention to the Great Lakes and the land, and his ardent espousal of the cause of agricultural meteorology, and the lecturing tours he made on behalf of this subject in all parts of the States, not only led to the establishment of the present magnificent Weather Bureau of the United States, but incidentally to his own decease through the fatigue and exposure thus encountered.

Maury's early religious training and temperament appear to have exercised a large influence on his public and private life. His physical geography is illustrated by frequent extracts from the Book of Job, and is instinct with the same spirit which prompted and pervaded the memorable Bridgwater Treatises. The following extract from his address to the University of the South will indicate this phase of his mind:—

> "Astronomy is grand and sublime, but astronomy overpowers with its infinities and overwhelms with its immensities. Physical geography charms with its wonders, and delights with the benignity of its economy. Astronomy ignores the existence of man; physical geography confesses that existence, and is based on the Biblical doctrine that the earth was made for man. Upon no other theory can it be studied—upon no other theory can its phenomena be reconciled."

The Civil War unfortunately destroyed the continuity of Maury's work at Washington, and altered the whole course of his subsequent life. Impelled by a spirit of pure patriotism towards the State of Virginia which had reared him, he threw up his post in the North, and devoted himself to the Southern cause. No one who reads the life before us, and his "vindication of the South and of Virginia" in the appendix, can doubt the pure unselfishness of his motives. He had everything to lose, and nothing to gain, from a material point of view, by his action, and well he knew it. Essentially a man of peace, and deeply attached to his work at Washington, we cannot but admire his voluntary resignation of all to a sense of duty.

His scientific abilities being directed into a new channel, led to the development of the electrical torpedo, by which he materially aided the South, and which he afterwards introduced into Europe, whither he was sent during the war, to purchase torpedo materials.

His subsequent connection with Mexico, and his scheme for emigrating Southerners thither, though designed with a view to ameliorate the condition of his countrymen, and to open up a grand country, was never approved of by his friends, was politically a mistake, and terminated abruptly with the abandonment of the country by the French, and the assassination of the Emperor Maximilian. After this he returned to England, and, ultimately, to a Professorship in Virginia.

All through his chequered life he maintained an unfaltering devotion to meteorology, and his latest efforts were directed to developing a comprehensive system of crop and weather reports throughout the States.

The perusal of this interesting book leaves us with a deep impression of the comprehensive grandeur and philanthropy of Maury's mind. A rare spirit of devotion to science, not merely for the pleasure it always affords its devotees, but for the good it could achieve in the service of man, pervaded his whole life, and the additional record here presented of work done and schemes initiated, will add fresh laurels to the imperishable fame of its subject. E. DOUGLAS ARCHIBALD.

OUR BOOK SHELF.

Pflanzen-Teratologie. Von Maxwell T. Masters, M.D., F.L.S. Ins Deutsche übertragen von Udo Dammer. (Leipzig: H. Haessel, 1886.)

IT will be satisfactory to English botanists to find that a translation of Dr. Masters's classical work on vegetable teratology has been called for in Germany. The present German edition is not, however, simply a translation, as it has received many additions from the hand of the author. The work is thus of interest to English as well as to German readers, for it constitutes the most complete account in any language of abnormal structures in plants. The great value of such a record of teratological facts will be admitted by all botanists, however much they may differ as to the morphological significance of these phenomena.

In the German edition, the number of figures in the text has increased from 218 to 243. As a few of the original woodcuts have been omitted, the number of new figures is somewhat greater than appears from the total increase. Besides the additional woodcuts, a lithographed plate has been added, drawn by the translator from original figures of Göschke and Magnus.

Some of the more important additions to the original work may here be noticed. At p. 35 a new section is introduced, on fasciation of the root, illustrated by a woodcut (Fig. 8) of the singularly fasciated aërial roots of *Aerides crispum.* Caspary's view that only a single growing point takes part in the formation of each fasciated root is cited.

Fig. 66 (p. 155) shows a proliferous male flower of a Begonia, in which the stamens are entirely absent, and replaced by flower-buds. The curious case of the development of flower-buds on the root in Pyrus is illustrated by Fig. 91, described at p. 188. A remarkable abnormality in a Fuchsia is shown in Fig. 98 (p. 208). Here two stamens (one simple and the other branched) have arisen in the axils of a pair of foliage-leaves, which are adherent to the inferior ovary. On p. 213 some figures have been added to further illustrate the formation of adventitious siliquæ in Cruciferæ in the interior of the normal fruit. In Figs. 131, 132, and 133 (p. 257) three interesting cases of regular peloria in orchids are shown.

A striking instance of pistillody of the stamens in a Begonia is figured on p. 353 (Fig. 178). In this flower the stamens were replaced by open carpels each bearing a large number of marginal ovules. A conspicuous abnormality in an Anthurium is shown in Fig. 204 (p. 411), under the head of "Polyphylly." Here a great number of large foliaceous bracts are developed on the spadix, completely altering the character of the inflorescence.

Two instances of polyandry in an Odontoglossum are represented in Figs. 213 and 214 (p. 439). In the former of these cases all the six stamens of the typical Monocotyledonous flower are present.

It should be mentioned that the additional woodcuts are generally reproductions of figures originally published by the author in the *Gardener's Chronicle.* In the plate added by the translator the most interesting figures are perhaps those illustrating a remarkable series of abnormal forms of the foxglove, the number of parts in a whorl varying from one to fourteen, and the flower in many cases being actinomorphic instead of zygomorphic. These figures, like most of those on the plate, are taken from papers by Magnus.

It is much to be wished that the numerous observations on teratology accumulated by Dr. Masters and others since 1869 could be embodied in a new and complete English edition. Until this wish is realized, the present German edition is likely to remain the most extensive treatise on the subject. D. H. S.

Parish Patches. By A. Nicol Simpson. (Arbroath: Thomas Buncle, 1888.)

THIS volume consists of a series of short essays, each of which gives expression to the author's delight in some particular aspect of Nature. He presents no new ideas or observations, but he has so warm a love for what he calls the pastoral side of life, that most of his readers will find something to interest them in his glowing descriptions of scenes which appeal strongly to his sympathies. The work is well printed on good paper with wide margins, and it is carefully illustrated by engravings from drawings by Mr. John S. Fraser.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Functionless Organs.

I HAVE read with extreme interest the abstract, given in your number of July 26 (p. 310), of a paper by Prof. Ewart, on the "Structure and Development of the Electric Organ of *Raia radiata.*" It bears upon a question of fundamental importance in biological science. Organic nature is full of organs, or of structures, which are either wholly or partly functionless. Sometimes they are called "aborted"; sometimes "degenerated"; sometimes "rudimentary"; sometimes "representative." But under whatever name, the Darwinian philosophy almost invariably explains them as structures, or parts of structures, which must have once been useful, and have become functionless by atrophy or disuse.

This is a natural and necessary consequence of the doctrine which ascribes all organic structures to utility as a physical cause. Utility as a mental purpose is kept out of sight. Utility in this last sense explains rudimentary structures by the uses or purposes which they are to serve in the future, or which, at least, they are capable of serving in the future. In this aspect rudimentary structures become "prophetic germs." But we